*Phytologia* (November 1991) 71(5):362-378.

# THE GENUS *SOLANUM* (SOLANACEAE) IN TEXAS

David E. Lemke

Department of Biology, Southwest Texas State University, San Marcos, Texas 78666 U.S.A.

ABSTRACT

This revised floristic treatment of *Solanum* in Texas incorporates additions to the flora as well as several nomenclatural changes. A key and revised descriptions are provided for all Texas species, including the following taxa not treated by Correll & Johnston: *S. citrullifolium* var. *setigerum*, *S. davisense*, *S. heterodoxum* var. *setigeroides*, *S. interius*, *S. sarrachoides*, and *S. tenuipes*.

KEY WORDS: *Solanum*, Solanaceae, Texas, floristics

*Solanum*, with more than 1400 species, is one of the largest genera of flowering plants and is distributed throughout the world. The greatest number of species is found in tropical America, but many species occur in temperate America and Africa as well (D'Arcy 1973).

Correll & Johnston (1970) recognized 20 species of *Solanum* in Texas; however, more recent treatments of infrageneric taxa in *Solanum* (Edmonds 1972; Heiser *et al.* 1979; Whalen 1979; Schilling 1981) have rendered Correll & Johnston's treatment obsolete. The present work provides a revised key and descriptions to facilitate the identification of the 24 species of nightshades currently known from Texas.

## *Solanum* L.

(Ours) annual or perennial herbs, erect, trailing or scandent shrubs, or small trees, prickly or unarmed. Leaves simple and entire to bipinnatifid or odd pinnate, with or without interstitial leaflets, petiolate, exstipulate but occasionally with pseudostipular leaves. Inflorescences cymose or racemose, axillary or terminal and becoming lateral. Flowers perfect, actinomorphic or somewhat zygomorphic. Calyx 5(6) lobed, occasionally accrescent and closely

investing the fruit, not inflated. Corolla 5 lobed, plaited in bud, rotate or stellate, blue to purple, less often yellow, rarely white. Stamens 5, connivent, the anthers equal or dimorphic, dehiscent by apical pores and sometimes also by longitudinal slits. Style entire or capitate. Fruit a usually 2 celled berry containing numerous seeds, in some species also with oval concretions of stone cells (sclerotic granules) among the seeds.

## KEY TO TEXAS SPECIES OF *SOLANUM*

1. Calyx with stramineous spinelike prickles. ..... (2)

1. Calyx lacking prickles, although these may be present on stems and leaves. ..... (10)

2. Corolla yellow. ..... 5. *S. rostratum*

2. Corolla violet to blue or white. ..... (3)

3. Anthers all approximately equal in length; calyx free from the fruit. ..... (4)

3. Anthers of two size classes, the four uppermost subequal, the lower one longer and declined against the corolla; calyx closely investing the fruit. ..... (7)

4. Pubescence at least in part of stellate hairs. ..... (5)

4. Stellate hairs absent. ..... 1. *S. capsicoides*

5. Stems and lower leaf surface silvery canescent due to the dense stellate indumentum. ..... 2. *S. elaeagnifolium*

5. Stems and lower leaf surface not as above, the pubescence not so dense. ..... (6)

6. Leaves deeply pinnatifid. ..... 3. *S. sisymbriifolium*

6. Leaves more or less entire to merely lobed. ..... 4. *S. campechiense*

7. Lower anther 6 mm or more long; corolla more than 1.5 cm across; stigma entire or only very slightly capitate. ..... (8)

7. Lower anther 5 mm or less long; corolla less than 1.5 cm across; stigma capitate. ..... 6. *S. heterodoxum*

8. Perennials from a woody or corky base; seeds plump. 9. *S. tenuipes*

8. Taprooted annuals; seeds flattened. ..... (9)

9. Lower anther 6-8 mm long; corolla to 1.7 cm across. ..... 8. *S. davisense*

9. Lower anther 10 mm or more long; corolla more than 2 cm across. ..... 7. *S. citrullifolium*

10. Pubescence of lower leaf surface and stems all or chiefly composed of stellate or dendritic hairs. ..... (11)

10. Pubescence of the lower leaf surface and stems composed entirely of simple hairs or occasionally lacking. ..... (15)

11. Herbage unarmed. ..... (12)

11. Herbage prickly. ..... (13)

12. Leaves ovate to ovate elliptic, densely tomentose with stellate hairs; inflorescence terminal. ..... 10. *S. erianthum*

12. Leaves narrowly elliptic to oblanceolate, moderately pubescent with dendritic hairs; inflorescence lateral. ..... 11. *S. capsicastrum*

13. Stems and lower leaf surface silvery canescent due to the dense pubescence. ..... 2. *S. elaeagnifolium*

13. Stems and lower leaf surface not as above, the typically tawny pubescence not so dense. ..... (14)

14. The 4 to 8 rayed stellate hairs sessile on lower leaf surface; fruit 1-2 cm in diameter. ..... 12. *S. carolinense*

14. At least some of the usually 8 or more rayed stellate hairs stipitate on lower leaf surface; fruit 2.5-3.0 cm in diameter. 13. *S. dimidiatum*

15. Leaves odd pinnate. ..... (16)

15. Leaves simple. ..... (18)

16. Pubescence of young stems glandular; corolla stellate, white; leaflets linear oblong to oblong lanceolate; pseudostipular leaves similar to the regular leaves. ..... 14. *S. jamesii*

16. Pubescence not glandular; corolla rotate to rotate stellate, light purple or rarely white; leaflets ovate to ovate elliptic or obovate; pseudostipular leaves semiovate. ..... (17)

17. Plant essentially glabrous; interstitial leaflets minute or lacking. ..... 15. *S. leptosepalum*

17. Plant more or less strigose; interstitial leaflets usually prominent. ..... 16. *S. fendleri*

18. Leaves deeply pinnatifid. ..... 17. *S. triflorum*

18. Leaves entire or merely sinuate, sometimes hastately lobed. ..(19)

19. Plants woody perennials, erect or scandent shrubs or subshrubs; leaves typically oblong or hastately ovate. .....(20)

19. Plants annual or perennial herbs; leaves typically ovate. .....(21)

20. Leaves broadest at or above the middle, tapered at base. .....
. .....18. *S. pseudocapsicum*

20. Leaves broadest below the middle, not tapered at base. .....
. .....19. *S. triquetrum*

21. Anthers 2.6-4.9 mm long; style usually exserted at least 1 mm beyond the anthers; strong perennials. .....20. *S. douglasii*

21. Anthers 1.2-2.6 mm long; style barely, if at all, exserted beyond the anthers; annuals or short lived perennial herbs. .....(22)

22. Calyx greatly enlarged in fruit, enveloping at least half of the berry; fruit brownish green at maturity. .....21. *S. sarrachoides*

22. Calyx not enlarged and enveloping the berry; fruit purplish black at maturity. .....(23)

23. Seeds mostly > 1.8 mm long; calyx lobes subequal in fruit. .....
. .....22. *S. interius*

23. Seeds mostly < 1.8 mm long; calyx lobes markedly unequal in fruit.
. .....23. *S. ptycanthum*

1. *Solanum capsicoides* All.

Perennial herbs, occasionally woody at the base, to 1.2 m tall, the stems pubescent with minute glandular capitate hairs and very sparsely villous with long jointed hairs, provided throughout with straight, broad based stramineous prickles to 10 mm long. Leaves ovate in outline, the blades repand to pinnately lobed, obtuse at the apex, slightly cordate at the base, 5-15 cm long, 3-12 cm wide; petiole to 5 cm long. Inflorescence short, few flowered. Calyx 5-10 mm long, the triangular-ovate lobes 3-4 mm long, prickly. Corolla white, 10-15 mm long, 12-25 mm in diameter. Stamens subequal, the anthers 3-5 mm long. Fruit scarlet, 20-50 mm in diameter. Seeds orbicular-ovoid, flat, 4.0-5.5 mm long, reticulate. *S. aculeatissimum* auct., *non* Jacq.

*Solanum capsicoides* is a member of *Solanum* sect. *Acanthophora*, a group of somewhat weedy species with a center of distribution in southeastern South

America. The species is apparently native to coastal areas of eastern Brazil (Nee 1979), but has become successfully established in open, lowland habitats in many tropical and subtropical areas of the world, including the Atlantic and Gulf coastal plains of the U.S. The only Texas specimens seen are early 20th century collections from Chambers County.

2. *Solanum elaeagnifolium* Cav.

Rhizomatous perennial herbs to 1 m tall, often woody at the base, the stems and branches densely covered with many rayed stellate hairs and sparsely to copiously armed with small acicular prickles to 3 mm long. Leaves narrowly lanceolate to oblong, entire to sinuate or undulate, obtuse at the apex, at the base rounded to tapering, 3-10(-15) cm long, 0.5-2 cm wide, with a few scattered acicular prickles on the midvein below; petioles to 2 cm long. Inflorescence 3 to 7 flowered. Calyx 5 angled, the triangular-ovate, attenuate lobes 6-8 mm long. Corolla blue to violet or rarely white, 20-35 mm in diameter. Anthers equal, 6-9 mm long. Fruit yellowish but turning black with age, 10-15 mm in diameter. Seeds brown, shining, ovoid or oblong, 3-5 mm long, nearly smooth. Chromosome number, $n = 12$. *S. texense* Engelm. & A. Gray, *S. roemerianum* Scheele.

*Solanum elaeagnifolium* is widespread throughout much of the southcentral U.S., from Kansas and Missouri south to Louisiana, Texas, Arizona, and adjacent México. It is our most abundant nightshade, occurring in waste places, disturbed soils, and open areas throughout most of the state.

The uncommon white flowered plants are referred to f. *albiflorum* Cockll.

3. *Solanum sisymbriifolium* Lam.

Annual herbs to about 0.8 m tall, the stems villous-pubescent with a mixture of glandular capitate and stellate hairs, armed with straight prickles to 6 mm long. Leaves ovate, the blades to 16 cm long, deeply pinnatifid, the lobes sinuate or again pinnatifid, pubescent above and below with a mixture of glandular capitate and stellate hairs; petioles to 5 cm long. Inflorescence terminal, soon becoming lateral, 3 to 5 flowered. Calyx 10-15 mm long, divided into 5 lanceolate to ovate lanceolate lobes 7-10 mm long. Corolla and anthers not seen. Fruit red, very loosely and completely or incompletely enclosed by the prickly calyx, 15-20 mm in diameter. Seeds yellowish brown, ovoid, flattened, 1.5-2.0 mm long, minutely reticulate.

*Solanum sisymbriifolium* is a native of Brazil that is occasionally adventive or escaped from cultivation in much of the eastern U.S. In Texas it is known from a 1927 collection from Wood County.

4. *Solanum campechiense* L.

Annual herbs to 0.6 m tall, the stems spreading, greenish, with large stipitate and much smaller sessile stellate hairs, armed with thin walled, yellowish prickles to 20 mm long. Leaves oblong to ovate, the blades more or less entire to somewhat 5 or rarely 7 lobed, the lobes coarsely dentate, obtuse at the apex, cordate basally, 5-12 cm long, 6-7 cm wide, densely pubescent with sessile stellate hairs and prickly along the veins above and below; petioles to 5 cm long. Inflorescence few-flowered. Calyx 6-8 mm long, the lobes ovate-lanceolate, acute, 3-5 mm long, accrescent to the fruit at maturity. Corolla pale violet, 15-20 mm in diameter. Stamens subequal, the anthers 4-5 mm long. Fruit red, 10-15 mm in diameter. Seeds yellowish brown, ovoid, plump, 2.0-2.3 mm long, dorsally tuberculate.

*Solanum campechiense* is a native of México and the West Indies that has been occasionally collected from fields and disturbed ground in brushlands in the Rio Grande Valley (Cameron, Hidalgo, and Zapata counties) with a disjunct collection from Nueces County.

5. *Solanum rostratum* Dun.

Spreading, taprooted annual herbs to 0.7 m tall, the stems stellate pubescent and densely beset with straight, sometimes broad based, prickles to 8 mm long. Leaves ovate to broadly ovate in outline, the blades 7-16 cm long, once or twice pinnatifid, the ultimate lobes rounded or obtuse, stellate pubescent above and below, and prickly along the main veins below; petioles to 10 cm long. Inflorescence 7 to 12 flowered. Calyx 6-13 mm long with linear lobes 6-10 mm long, nearly hidden by the dense covering of stellate hairs and prickles. Corolla yellow, 25-35 mm in diameter. Anthers unequal, the four uppermost yellow, 6-8 mm long, the lowermost suffused with purple, arcuate, 10-14 mm long. Fruit 9-12 mm in diameter, tightly invested by the prickly, accrescent calyx tube. Seeds dark brown, ovoid, flattened, 2.0-2.6 mm long, minutely foveolate. Chromosome number, $n = 12$.

*Solanum rostratum* is an aggressive, weedy species native to the south-central U.S. from Nebraska to Texas and south into México, but it is widely adventive elsewhere. It is frequently found in disturbed soils and waste places throughout the state.

6. *Solanum heterodoxum* Dun.

Spreading annual herbs from a slender taproot, to about 0.7 m tall, the stems with scattered glandular capitate hairs and yellow prickles to 8 mm long. Leaves broadly ovate to deltoid in outline, 4-11 cm long, twice pinnatifid, the

ultimate lobes obtuse or rounded, above with a mixture of glandular and eglandular hairs, below with scattered stellate and short stipitate glandular hairs, prickly along the main veins below; petioles to 5 cm long. Inflorescence 5 to 9 flowered. Calyx 10 mm long with lanceolate lobes 7-8 mm long. Corolla violet or blue, 10-17 mm in diameter. Anthers unequal, the four uppermost yellow, 2.5-4.0 mm long, the lowermost purple tinged and about 1 mm longer than the upper anthers. Stigma distinctly capitate. Fruit 9-12 mm in diameter, tightly invested by the prickly, accrescent calyx tube. Seeds dark brown, ovoid, flattened, 2.5-2.9 mm long, minutely foveolate. Chromosome number, $n = 12$.

Whalen (1979) recognized three varieties in *Solanum heterodoxum*: var. *heterodoxum*, var. *novomexicanum* Bartl., and var. *setigeroides* M.D. Whalen. Only var. *setigeroides* is known from Texas, having been collected from El Paso, Hudspeth, and Culberson counties.

Correll & Johnston (1970) included *Solanum heterodoxum* in *S. citrullifolium* A. Braun. The two species are quite distinct, however, being easily distinguished by corolla size (<1.5 cm diam. in *S. heterodoxum* versus >2 cm diam. in *S. citrullifolium*) and stigma morphology (capitate in *S. heterodoxum* versus entire in *S. citrullifolium*).

7. *Solanum citrullifolium* A. Braun

Much branched and spreading taprooted annual herbs to about 0.7 m tall, the stems and branches pubescent with a mixture of simple glandular capitate hairs and a few longer uniseriate hairs, armed with straight yellow prickles 2-7 mm long. Leaves broadly ovate in outline, irregularly bipinnatifid and usually pinnatisect near the base, the lobes obtuse or rounded, 4-10 cm long, glandular pubescent, occasionally with a few long uniseriate hairs above and scattered, stellate hairs below; petioles to 5 cm long. Inflorescence 6 to 10 flowered. Calyx 4-5 mm long with linear-lanceolate lobes 2-3 mm long. Corolla violet or blue, 25-35 mm in diameter. Stamens unequal, the 4 uppermost with yellow anthers 6-10 mm long, the lowermost anther arcuate, violet-tinged terminally, 11-16 mm long. Stigma entire. Fruit 8.5-11.5 mm in diameter, closely invested by the prickly, accrescent calyx tube. Seeds ovoid, flattened, dark brown, 2.3-2.9 mm long. Chromosome number, $n = 12$.

Whalen (1979) recognized three varieties in *Solanum citrullifolium*, two of which occur in Texas. Var. *setigerum* Bartlett is found on various substrates in the Trans-Pecos, and in eastern Chihuahua and western Coahuila; it is characterized by stems that are densely covered with spreading or retrorse acicular prickles. Var. *citrullifolium*, characterized by stems with scattered subulate prickles, is found primarily on igneous soils in the Trans-Pecos and adjacent México, with disjunct populations in the Llano Uplift area. Although Whalen reported var. *citrullifolium* to be very scarce in central Texas, having

been collected only twice since 1930, the last time in 1949, I found the plants to be locally common in disturbed roadside habitats in Burnet County in 1989.

8. *Solanum davisense* M.D. Whalen

Taprooted annual herbs 0.4-0.7 m tall, the stems and branches viscid pubescent with a mixture of simple glandular capitate hairs and fine spreading uniseriate hairs, armed with straight yellow prickles 3-7 mm long. Leaves broadly ovate in outline, 2 to 3 times pinnatifid, the ultimate lobes narrowly deltoid to lanceolate, 5-10 cm long, prickly along the main veins, weakly strigulose above, below with few-rayed stellate and scattered short stipitate glandular hairs; petioles to 3 cm long. Inflorescence 5 to 9 flowered. Calyx 4-5 mm long with linear-lanceolate lobes 2-3 mm long. Corolla violet or blue, 13-20 mm in diameter. Anthers unequal, the 4 uppermost yellow, 4.0-5.5 mm long, the lowermost arcuate, violet tinged at the apex, 5.5-8.5 mm long. Stigma weakly capitate. Fruit 8-10 mm in diameter, closely invested by the prickly, accrescent calyx tube. Seeds ovoid, flattened, dark brown, 2.6-3.0 mm long. Chromosome number, $n = 12$.

*Solanum davisense* occurs sporadically on igneous soils and in sandy or gravelly streambeds, mostly above 1500 m, in the Davis, Chisos, and Chinati mountains of Trans-Pecos Texas, and in the Sierra del Carmen of adjacent Coahuila, México.

9. *Solanum tenuipes* Bartlett

Spreading perennial herbs from woody or corky roots and rhizomes, 20-70 cm tall, the stems viscid pubescent with a mixture of glandular capitate and spreading uniseriate hairs or occasionally glabrate, armed with widely spaced pale yellow prickles 2-8 mm long. Leaves broadly ovate, to 15 cm long, 2 to 3 times pinnatifid, the ultimate lobes usually rounded or obtuse at the apex, glandular capitate and often with scattered uniseriate eglandular hairs above, below with abundant short stipitate glandular capitate and few to numerous stellate hairs, prickly along the main veins below; petioles to 6 cm long. Inflorescence 6 to 9 flowered. Calyx 5-8 mm long with lanceolate to linear lobes 3-5 mm long. Corolla blue or violet, 25-35 mm in diameter. Anthers unequal, the 4 uppermost yellow, 7-10 mm long, the lowermost tinged with purple apically, arcuate, 12-20 mm long. Fruit wholly enclosed by the prickly accrescent calyx tube or nearly so, 7-10 mm in diameter. Seeds dark brown, reniform, 2.7-3.6 mm long, minutely foveolate. Chromosome number, $n = 12$.

*Solanum tenuipes* is similar in aspect to *S. citrullifolium*, but can be easily distinguished by its perennial habit, smaller fruits (7-10 versus 8.5-11.5 mm in diameter), and larger seeds (2.7-3.6 versus 2.3-2.9 mm long). The species is found on calcareous or gypseous soils in open desert or semidesert in west Texas and northern México.

Whalen (1979) recognized two varieties in *Solanum tenuipes*, both of which occur in Texas. In var. *tenuipes* the largest leaves are thrice pinnatifid and the seeds 3.1-3.6 mm in length; it is distributed from eastern Coahuila north into Brewster, Terrell, Val Verde, and Maverick counties. Var. *latisectum* M.D. Whalen has leaves only twice pinnatifid and seeds 2.7-3.1 mm long; it is distributed primarily in northern México (Chihuahua, Coahuila, Durango) and adjacent Texas (Presidio, Brewster, Terrell, Crockett, and Maverick counties).

10. *Solanum erianthum* D. Don

Shrubs or small trees to 3 m tall, the young stems velvety tomentose throughout with a dense stellate indumentum. Leaves ovate to ovate elliptic or elliptic, entire, acute to acuminate at the apex, rounded at the base, 5-20 cm long, 2-12 cm wide, densely tomentose with stellate hairs below, less densely vestitured above; petioles to 8.5 cm long. Inflorescence usually terminal, many flowered. Calyx 6-8 mm long, tomentose, with ovate lobes 2.5-3.5 mm long. Corolla white, 15-18 mm in diameter, the lobes ciliate. Anthers equal, 2-3 mm long. Fruit yellow, 10-20 mm in diameter. Seeds yellowish brown, ovoid, flattened, 1.5-2.0 mm long, minutely reticulate. *S. verbascifolium* auct.

*Solanum erianthum* is distinctive among the Texas species of *Solanum* by its habit and densely tomentose, almost felty leaves. The species is a pantropical weed, widely distributed in the Old and New World. In Texas, it is known from several collections in thickets along the margin of the Resaca del Rancho Viejo in Cameron County and from a single collection in loose sand at the edge of live oak mottes in Kenedy County.

11. *Solanum capsicastrum* Link

Small shrubs to about 0.7 m tall, the stems densely pubescent with small dendritic hairs. Leaves narrowly elliptic to oblanceolate, entire to sinuate or undulate, revolute, obtuse or rounded at the apex, tapering at the base, 1-7 cm long, 0.5-1.5 cm wide, pubescent above and below with short dendritic hairs; petioles to 1 cm long. Flowers solitary or 2-3 in lateral inflorescences. Calyx 6-7 mm long, the lanceolate lobes 3-4 mm long. Corolla white, to 15 mm in diameter. Fruit orange-red or scarlet, 8-10 mm in diameter. Seeds orange-brown, flattened, 2.5-3.5 mm long, minutely reticulate.

*Solanum capsicastrum*, the false Jerusalem cherry, is a native of Brazil that occasionally escapes from cultivation. In Texas the species has been collected from several localities along the Gulf coastal plain (Harris, Colorado, and Victoria counties).

12. *Solanum carolinense* L.

Rhizomatous perennial herbs to approximately 1 m tall, pubescent throughout with 4 to 8 rayed sessile stellate hairs and armed with stout yellow prickles to 4 mm long. Leaves ovate elliptic to ovate, shallowly lobed or toothed, obtuse to acute at the apex, rounded or cuneate at the base, 3-12 cm long, 1.5-5.0 cm wide, prickly along the veins below; petioles to 1.5 cm long. Inflorescence 3 to 8 flowered. Calyx 5-7 mm long, the lanceolate-acuminate lobes 2.0-3.5 mm long. Corolla pale violet to occasionally white, 20-30 mm in diameter. Anthers equal, 6-8 mm long. Fruit yellow, 10-20 mm in diameter. Seeds yellowish-brown, orbicular-ovate, flattened, 2.2-2.6 mm long, minutely rugose.

*Solanum carolinense* occurs throughout the eastern U.S. as far west as Minnesota and Texas. In Texas, the species is found primarily on sandy soils of the Piney Woods region, as far west as Grayson, Anderson, and Brazoria counties.

The white flowered plants are known as f. *albiflorum* Benke.

13. *Solanum dimidiatum* Raf.

Rhizomatous perennial herbs to about 1 m tall, the stems and branches densely vestitured with 8 to 12 rayed, often stipitate, stellate hairs and sparingly armed with small stout prickles to 5 mm long. Leaf blades ovate, sinuately 5 to 7 lobed, entire to undulate, rounded at the apex, at the base rounded to truncate or cordate, 6-15 cm long, 5-10 cm wide, both surfaces densely beset with 8 to 12 rayed sessile and stipitate stellate hairs, the midrib below provided with short subulate prickles or these sometimes wanting; petioles stout, to 3 cm long. Inflorescence 4 to 20 flowered. Calyx 7-10 mm long, the 5 or 6 triangular-ovate, acuminate lobes 3-5 mm long. Corolla bluish purple to violet, rarely white, 30-50 mm in diameter. Anthers equal, 8-12 mm long. Fruit pale yellow, 25-30 mm in diameter. Seeds light brown, oval, 3.8-4.3 mm long, minutely rugose. Chromosome number, $n = 12$. *S. torreyi* A. Gray.

*Solanum dimidiatum* is a prairie species of the southcentral U.S. (Kansas and Missouri south to Texas). It is similar in general aspect to *S. carolinense*, but differs in the presence of stipitate, as well as sessile, stellate hairs on the leaf blades, larger anthers (8-12 mm versus 6-8 mm long), and a larger fruit (2.5-3.0 cm versus 1-2 cm in diameter). Although their ranges in Texas overlap

slightly, *S. dimidiatum* is primarily a species of prairie soils in the central part of the state, while *S. carolinense* is restricted to the sandier soils of east Texas.

The white flowered individuals have been treated as f. *album* (Waterfall) Correll.

14. *Solanum jamesii* Torr.

Stoloniferous and tuber bearing perennial herbs, occasionally becoming suffrutescent, usually to about 0.3 m tall, rarely to 0.5 m, the stems with a mixture of coarse flattened uniseriate hairs and much smaller glandular capitate hairs. Tubers often numerous, globose to ellipsoid, white or light brown, 5-20 mm in diameter. Leaves odd pinnate, to 15 cm long, only rarely with small interstitial leaflets, the rachis somewhat winged; leaflets 7-11, linear oblong to lanceolate, to 6 cm long and 2 cm wide but usually much smaller, strigose with numerous flattened uniseriate hairs and scattered glandular hairs above and below. Inflorescence few flowered, the pedicels distinctly articulate at or above the middle. Calyx 3.5-8.0 mm long, irregularly lobed for about half its length. Corolla white, 15-25 mm in diameter. Anthers equal, 3-4 mm long. Style well exserted beyond the anthers. Fruit purplish black, 8-9 mm in diameter. Seeds not seen.

*Solanum jamesii* is found at elevations of 1400 m and above in the southwestern U.S. (Arizona, Utah, Colorado, New Mexico, Texas) and adjacent México. In Texas the species is relatively rare in the mountains of the Trans-Pecos (El Paso, Hudspeth, Culberson, and Jeff Davis counties).

15. *Solanum leptosepalum* Correll

Stoloniferous perennial herbs, occasionally becoming suffrutescent, to 0.5 m tall, the stems sparsely appressed strigose throughout or glabrous. Leaves odd pinnate, to 20 cm long, sparsely pubescent at the margins, the interstitial leaflets absent or minute; leaflets 5(7), ovate to ovate-elliptic, the lowermost pair much reduced, to 7 cm long and 3.5 cm wide. Inflorescence few flowered, the pedicels articulate at or well above the middle. Calyx 6-8 mm long, the ovate-lanceolate long acuminate lobes 3-5 mm long. Corolla purplish to white, 20-25 mm in diameter. Anthers equal, 6-8 mm long. Style well exserted beyond the anthers. Fruit not seen, reported by Correll (1952) to be about 15 mm in diameter. Seeds not seen.

*Solanum leptosepalum* was described by Correll (1952) from a single collection and has since been sporadically collected from the mountains of Trans-Pecos Texas and adjacent Coahuila, México. I am not convinced that the taxon is specifically distinct from the widespread and variable Mexican species *S. verrucosum* Schlecht.

16. *Solanum fendleri* A. Gray

Stoloniferous and tuber bearing perennial herbs, occasionally becoming suffrutescent, to about 0.5 m tall, the stems more or less strigose. Tubers globose to ellipsoid, white or suffused with purple, to 3 cm long. Leaves odd pinnate, to 10 cm long, with or without small interstitial leaflets; principal leaflets 5-9, ovate to oblong elliptic or obovate, at the apex obtuse to acute, to 8 cm long and 3.5 cm wide. Inflorescence 3 to many flowered, the pedicels distinctly articulate well above the middle. Calyx 4-6 mm long, the ovate-lanceolate acuminate lobes 3-4 mm long. Corolla blue or purplish, rarely white, usually less than 30 mm in diameter. Anthers equal, 4-6 mm long. Fruit purplish black, 6-8 mm in diameter. Seeds not seen.

*Solanum fendleri* is distributed in mountains from Colorado south through Arizona, New Mexico, and Texas to Zacatecas, México. In Texas the species has been collected from Brewster, Culberson, and Jeff Davis counties.

Var. *texense* Correll, restricted to the Davis Mts., is a taller and more open plant than var. *fendleri*. The dense pubescence of the calyx imparts a grayish color to the inflorescence. The white to whitish lavender corolla is more deeply lobed, with narrower and more acute sinuses, and the calyx is irregularly and more deeply lobed than typical.

17. *Solanum triflorum* Nutt.

Taprooted annual herbs, erect or ascending, to 0.4 m tall or long, the stems more or less strigose. Leaves ovate to elliptic, deeply pinnatifid, the lobes linear or nearly so, 1-4 cm long, 0.5-2.0 cm wide, strigose above and below; petioles to 2 cm long. Inflorescence 1 to 3 flowered. Calyx 4-5 mm long with lanceolate lobes 3-4 mm long. Corolla white, 8-10 mm in diameter. Anthers equal, 2.0-2.5 mm long. Fruit green at maturity, 10-15 mm in diameter, containing 4-8 sclerotic granules. Seeds yellowish-brown, ovoid, flattened, 2.0-2.5 mm long, minutely reticulate.

*Solanum triflorum* is very distinctive by its unarmed, deeply pinnatifid leaves. The species is widely distributed across the western half of the U.S. and is occasionally adventive eastward to the Atlantic states. In Texas it has been collected in Culberson and Hemphill counties.

18. *Solanum pseudocapsicum* L.

Small shrubs to about 1.2 m tall, the stems puberulent with small dendritic hairs or glabrous. Leaves narrowly lanceolate to oblong or oblanceolate, entire or somewhat sinuate, revolute, obtuse or acuminate at the apex, tapering at the base, 2-10 cm long, 0.5-1.5 cm wide, sparsely to densely pubescent with

small dendritic hairs or rarely glabrous; petioles to 1 cm long or the leaves subsessile. Flowers solitary or 2-3 in lateral inflorescences. Calyx 4-6 mm long, the deltoid to lanceolate lobes 1.5-3.0 mm long. Corolla white, 10-15 mm in diameter. Anthers equal, 2.5-3.0 mm long. Fruit orange-red or rarely yellow, 10-20 mm in diameter. Seeds yellowish brown, flattened, 2-4 mm long, minutely reticulate.

*Solanum pseudocapsicum* is a native of the Old World that has become naturalized throughout much of the New World tropics and subtropics. In Texas the species is known from several collections in Jasper County, the most recent dating from 1954.

19. *Solanum triquetrum* Cav.

Erect suffruticose perennials to 0.5 m tall or more commonly scandent and reaching 2 m in length, the young stems somewhat striate, glabrous. Leaves deltoid to cordate, usually hastate or hastately 3 or 5 lobed, the central lobe ovate to lanceolate or linear lanceolate, 0.5-5 cm long, glabrous or with a few short marginal hairs. Inflorescence 2 to 5 flowered, the pedicels articulate at the base. Calyx 1.5-3.0 mm long, the deltoid to linear lanceolate lobes 0.5-1.5 mm long. Corolla white or violet tinged, 10-15 mm in diameter. Anthers equal, 2-4 mm long. Fruit red, 10-15 mm in diameter. Seeds yellowish brown, ovoid, flattened, 2.5-3.5 mm long, rough textured. *S. lindheimerianum* Scheele.

*Solanum triquetrum* is common on slopes, disturbed ground, and in thickets in central, west, and south Texas and adjacent México, often flowering throughout the year. The species is highly variable, especially in regard to its habit and leaf shape.

20. *Solanum douglasii* Dun.

Perennial herbs or subshrubs, usually to about 1 m tall but occasionally to as much as 3 m, the stems sparsely to densely puberulent with simple appressed or subappressed hairs or less often villous with spreading hairs, small glandular capitate hairs often present as well. Leaves ovate to narrowly ovate elliptic, the blades entire to sinuate or irregularly dentate, acute to obtuse at the apex, basally cuneate to subtruncate, 3-8 cm long, 1.5-4.0 cm wide, sparsely to densely strigose above and below; petioles slightly winged, to 3 cm long. Inflorescence 4 to 6 flowered, the flowers usually disposed in umbelliform cymes or occasionally solitary. Calyx 1-2 mm long, with ovate to lanceolate or rounded lobes less than 1 mm long. Corolla white, sometimes tinged with purple, 10-18 mm in diameter. Anthers equal, 2.5-4.9 mm long. Style exserted beyond the anthers by at least 1 mm; stigma only slightly expanded. Fruit purplish black, 5-10 mm in diameter, containing 4-10 sclerotic granules. Seeds

yellowish brown, ovoid, plump, 1.2-1.5 mm long, minutely reticulate. Chromosome number, $n = 12$.

*Solanum douglasii* is widespread, but infrequent, from Louisiana and Texas to California, south through México to Central America. In Texas the species has been collected from all regions of the state but is poorly represented from the High Plains and Rolling Plains.

*Solanum douglasii*, *S. sarrachoides* Sendt., *S. interius* Rydb., and *S. ptycanthum* Dun. *ex* DC. constitute the Texas representatives of the *Solanum nigrum* L. complex (*Solanum* sect. *Solanum*), a taxonomically difficult group of weedy species that are often adventive far from their original habitats (Stebbins & Paddock 1949). Recent studies by Heiser *et al.* (1979), Schilling & Heiser (1979), and Schilling (1981) have helped to clarify the delimitation of the North American members of the complex.

Reports of *Solanum villosum* Mill. from Texas (Correll & Johnston 1970) were based in part on misidentified densely puberulent specimens of *S. douglasii*.

21. *Solanum sarrachoides* Sendt.

Taprooted annual herbs, erect or decumbent, to 0.8 m tall or long, the stems viscid pubescent with uniseriate glandular capitate hairs. Leaves triangular ovate to ovate, entire to undulate or dentate, apically acute, at the base cuneate to truncate, 2-5 cm long, 1-3 cm wide, sparsely glandular pubescent marginally and on the main veins above and below; petioles slightly winged, to 2 cm long. Inflorescence umbellate, 2 to 6 flowered. Calyx 1.5-2.0 mm long, the lanceolate lobes 0.5-1 mm long. Corolla white, 5-7 mm in diameter. Anthers equal, 1.5-2.0 mm long. Fruit brownish green to nearly black, the lower one third to one half loosely invested by the enlarged calyx, 6-10 mm in diameter, containing 5-7 sclerotic granules. Seeds yellowish brown, ovoid, 1.7-2.4 mm long, minutely reticulate. Chromosome number, $n = 12$.

*Solanum sarrachoides* is a native of South America that is adventive and widespread in fields and disturbed areas throughout much of North America. In Texas the species is known from a single collection in the Chisos Mts. of Brewster County (Sperry 475 [SRSC]). This specimen was misidentified as *S. villosum* Mill., a tetraploid Eurasian member of sect. *Solanum* that, like *S. sarrachoides*, is glandular pubescent, but lacks the enlarged, accrescent calyx. No specimens referable to *S. villosum* have been seen from Texas.

The specific epithet is spelled "*sarachoides*" by some authors.

22. *Solanum interius* Rydb.

Deeply rooted annual or short lived perennial herbs to 0.8 m tall, the stems sparsely to densely strigose. Leaves ovate to triangular ovate or rhombic, entire, undulate or sinuate, apically obtuse, acute or short acuminate, at the base cuneate, rounded, or subtruncate, 3-7(-10) cm long, 1-4 cm wide, sparsely to densely strigose, especially below; petioles slightly winged, to 3 cm long. Inflorescence umbellate, 2 to 6 flowered. Calyx 1.5-2.0 mm long with ovate lobes 1.0-1.5 mm long. Corolla white or blue-violet, occasionally with purple stripes, 15-20 mm in diameter. Anthers equal, 1.6-2.0 mm long. Fruit dull purple-black, 5-10 mm in diameter, containing 2 or rarely 4 sclerotic granules. Seeds yellow to brown, ovoid, flattened, 1.9-2.3 mm long, minutely reticulate. Chromosome number, $n = 12$. *S. nigrum* L. var. *interius* (Rydb.) F.C. Gates.

*Solanum interius* is found in sandy soils throughout much of the Great Plains, from North Dakota to Idaho, south to Texas and New Mexico. Our collections are primarily from sandy sites in the High Plains (Hartley, Hemphill, Ochiltree, and Wheeler counties) with disjunct collections from Taylor and Jeff Davis counties.

23. *Solanum ptycanthum* Dun. *ex* DC.

Taprooted annual herbs 0.3-0.6 m tall, rarely to 1 m or more in height, the stems glabrous to moderately strigose, unarmed. Leaves very variable, ovate to ovate lanceolate, entire to sinuate dentate, acute, acuminate, or obtuse at the apex, at the base cuneate or rounded to subcordate, 5-15 cm long, 2-5 cm wide, glabrous to moderately strigose; petioles usually winged, to 4 cm long. Inflorescence umbellate, 2 to 4 flowered. Calyx 1.5-2.0 mm long, unequally 5 lobed, the triangular to lanceolate or rounded lobes 1.0-1.5 mm long, unequal and partially fused in fruit, not reflexed. Corolla white or tinged with purple, 10-15 mm in diameter. Anthers equal, 1.4-1.9 mm long. Fruit purplish black, 5-9 mm in diameter, usually containing 6 or more sclerotic granules. Seeds yellowish brown, ovoid, plump, 1.5-1.9 mm long, minutely reticulate. Chromosome number, $n = 12$.

*Solanum ptycanthum* is widespread throughout eastern North America, west to North Dakota and Texas. The species is found in most regions of the state in open woodlands, along streams and roadsides, and in waste places.

These plants were treated as *Solanum americanum* Mill. by Correll & Johnston (1970). Heiser *et al.* (1979) have argued, however, that this name should be applied to those plants previously recognized as *S. nodiflorum* Jacq. and that the name *S. ptycanthum* should be used for plants previously referred to as *S. americanum*. Although *S. americanum* (as *S. nodiflorum*) was reported from coastal Texas by Jones *et al.* (1961), I have seen no specimens from the state and do not consider the species to be a member of our flora.

Cultivated species: *Solanum diphyllum* L. is occasionally planted as an ornamental shrub and has been collected from Harris County (Houston) and Travis County (Austin). The species is easily recognized by the 1-2 small, rounded pseudostipular leaves produced at the base of each simple elliptic-ovate leaf and by the subumbellate inflorescences borne on lignified lateral peduncles, these bearing prominent pedicel scars in fruit.

## ACKNOWLEDGMENTS

Appreciation is extended to Guy Nesom and Mark Bierner for their critical reviews of the manuscript.

## LITERATURE CITED

Correll, D.S. 1952. Section *Tuberarium* of the genus *Solanum* of North America and Central America. U.S.D.A. Agric. Monogr. 11:1-243.

Correll, D.S. & M.C. Johnston. 1970. *Manual of the Vascular Plants of Texas.* Texas Research Foundation, Renner, Texas. 1881 pp.

D'Arcy, W.G. 1973. Flora of Panama. Family 170. Solanaceae. Ann. Missouri Bot. Gard. 60:573-780.

Edmonds, J.M. 1972. A synopsis of *Solanum* sect. *Solanum* (*Maurella*) in South America. Kew Bull. 27:95-114.

Heiser, C.B., Jr., D.L. Burton, & E.E. Schilling. 1979. Biosystematic and taxometric studies of the *Solanum nigrum* complex in eastern North America. Pp. 513-527 *in* J.G. Hawkes, R.N. Lester, & A.D. Skelding, eds., *The Biology and Taxonomy of the Solanaceae*, Academic Press, London, U.K. 738 pp.

Jones, F.B., C.M. Rowell, Jr., & M.C. Johnston. 1961. Flowering plants and ferns of the Texas coastal bend counties. Welder Wildlife Foundation Publ. B-1, Sinton, Texas. 165 pp.

Nee, M. 1979. Patterns in biogeography in *Solanum*, section *Acanthophora.* Pp. 569-580 *in* J.G. Hawkes, R.N. Lester, & A.D. Skelding, eds., *The Biology and Taxonomy of the Solanaceae*, Academic Press, London, U.K. 738 pp.

Schilling, E.E. 1981. Systematics of *Solanum* sect. *Solanum* (Solanaceae) in North America. Syst. Bot. 6:172-185.

_____ & C.B. Heiser. 1979. Crossing relationships among diploid species of the *Solanum nigrum* complex in North America. Amer. J. Bot. 66:709-716.

Stebbins, G.L., Jr. & E.F. Paddock. 1949. The *Solanum nigrum* complex in Pacific North America. Madroño 10:70-81.

Whalen, M.D. 1979. Taxonomy of *Solanum* sect. *Androceras*. Gent. Herb. 11:359-426.